

BONE STORE (PWS 7100159)
SOURCE WATER ASSESSMENT FINAL REPORT

June 9, 2004




State of Idaho
Department of Environmental Quality

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Executive Summary

Under the Federal Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the Act. The Idaho Department of Environmental Quality (DEQ) is completing the assessments for all Idaho public drinking water systems. The assessment for the Bone Store drinking water source is based on a land use inventory within a 1,000-foot radius of the well source, sensitivity factors associated with the source, and characteristics associated with either your aquifer or watershed in which you live.

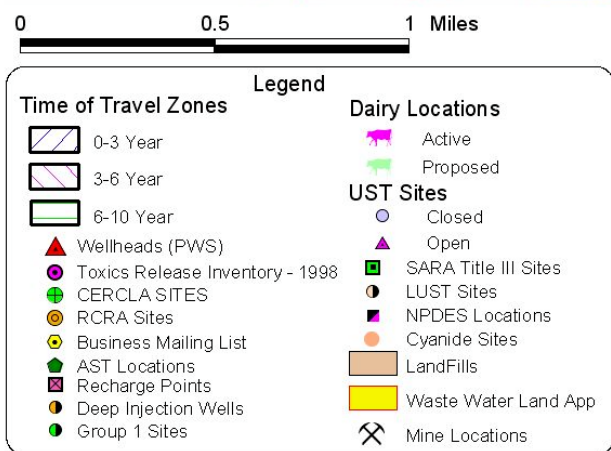
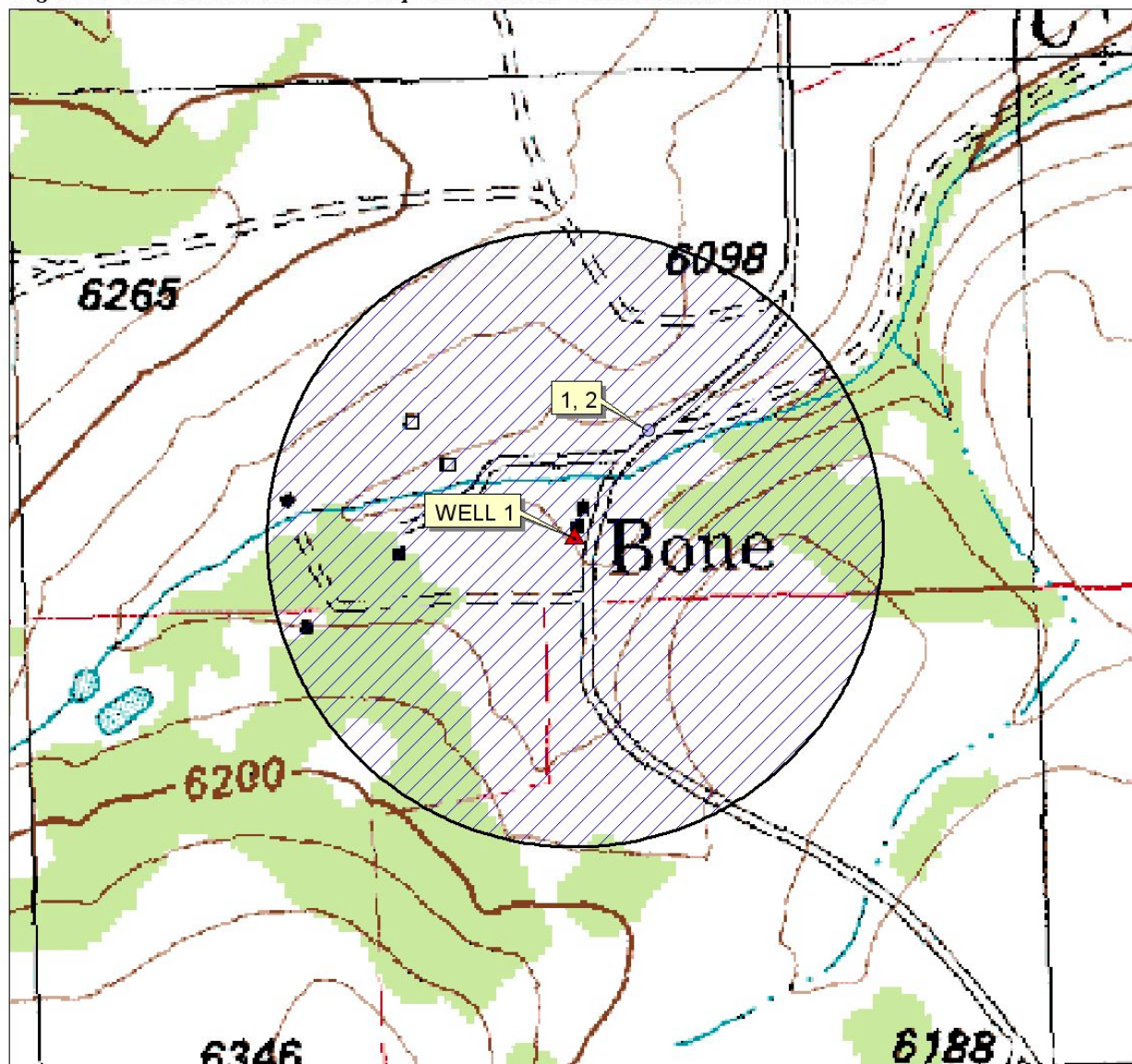
This report, Source Water Assessment for Bone Store (PWS # 7100159) describes the public drinking water system, the associated potential contaminant sources located within a 1,000-foot boundary around the drinking water source, and the susceptibility that may be associated with any associated potential contaminants. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this system. **The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the Bone Store water system.**

The Bone Store is located in Bone, Idaho, in Caribou County (see Figure 1). The  community transient water system has one well serving 20 to 60 people through one (1) connection. Water quality tests conducted for the well do not show detections of total coliform bacteria from November 2000 through January 2004. However, there have been detections of nitrate within the sampled well water, at levels well below the maximum contaminant level (MCL) of 10 milligrams per liter (mg/L) as set by the EPA.

Final susceptibility scores are derived from equally weighting system construction scores, hydrologic sensitivity scores, and potential contaminant/land use scores. Therefore, a low rating in one or two categories coupled with a higher rating in other categories results in a final rating of low, moderate, or high susceptibility. With the potential contaminants associated with most urban and heavily agricultural areas, the best score a well can get is moderate. Potential contaminants are divided into four categories, inorganic contaminants (IOCs, e.g. nitrates, arsenic), volatile organic contaminants (VOCs, e.g. petroleum products), synthetic organic contaminants (SOCs, e.g. pesticides), and microbial contaminants (e.g. bacteria). As different wells can be subject to various contamination settings, separate scores are given for each type of contaminant.

The final susceptibility ranking for the well is high for IOCs, VOCs, SOCs, and moderate for microbial contamination. A copy of the susceptibility analysis for the Bone Store well along with a map showing potential contaminant sources are included with this summary. Information regarding the potential contaminants within the 1,000-foot boundary have been summarized and included in Table 1.

Figure 2. Bone Store Delineation Map and Potential Contaminant Source Locations



PWS# 7100159
WELL 1

Potential Contamination

The potential contaminant sources identified within the delineated areas include the improved highway, the local creek, and a gas station (see Table 1 and Figure 2). If an accidental spill occurred along these transportation corridors within the delineation area, then IOC's (e.g. nitrate), VOCs (e.g. petroleum products), SOC's (e.g. pesticides), and microbial contaminants (e.g. bacteria) could be added to the ground water. The gas station leaking underground storage tank cleanup has been identified to have impacted the ground water as well.

Table 1. Bone Store Potential Contaminant Inventory

| Map ID | Source Description ¹ | Source of Information | Potential Contaminants ² |
|--------|---|-----------------------|-------------------------------------|
| 1, 2 | LUST site; site cleanup complete, Impact: ground water; UST – closed, gas station | Database search | VOC, SOC |
| | Improved highway | GIS Map | IOC, VOC, SOC, M |
| | Local creek | GIS Map | IOC, VOC, SOC, M |

¹ LUST = leaking underground storage tank, UST = underground storage tank

² IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical, M= microbial

Susceptibility Analysis

The water system's susceptibility to contamination was ranked as high, moderate, or low risk according to the following considerations: hydrologic characteristics, physical integrity of the well, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants.

Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. Appendix A contains the susceptibility analysis worksheet. The following summaries describe the rationale for the susceptibility ranking.

The hydrologic sensitivity was rated high for the well. This rating is based upon multiple factors. The soils rate as predominantly moderate- to well-drained as defined by the Natural Resource Conservation Service. The recent sanitary survey (D7HD, 2001) states that the depth of the well is 35 feet. According to the well log, the composition of the vadose zone is listed as "top soil" to 15 feet below ground surface (bgs), and the depth of the water table is 18 feet bgs. Given that the well is only 35 feet deep, it is not possible for there to be 50 feet of low permeability layers between ground surface and the producing zone.

The system construction score was rated moderate for the well. According to the recent sanitary survey (D7HD, 2001), Well 1 meets wellhead and sanitary surface seal standards and is protected from surface flooding. The well was drilled in November of 2000 to a depth of 36 feet bgs. The static water level at the time of drilling was 18 feet bgs. The well has a 0.250-inch thick, 8-inch diameter casing from the 18 inches above ground surface to 25 feet bgs into hard limestone. A bentonite seal was installed from ground surface to 20 feet bgs into broken

limestone, which is not considered to be a low permeability unit because the well log indicates that it is a producing zone.

The Idaho Department of Water Resources *Well Construction Standards Rules* (1993) require all PWSs to follow DEQ standards as well. Standard 3.2.4.1 requires all PWSs to have yield and drawdown tests that last “24 hours or until stabilized drawdown has continued for six hours at 1.5 times” the design pumping rate (IDEQ, 1997). Table 1 of the *Recommended Standards for Water Works* (1997) lists the required steel casing thickness for various diameter wells. Eight-inch diameter wells require 0.322-inch thick casing. The Bone Store well used 0.250-inch thick casing. The information available for the Bone Store indicates that the well does not meet all of the well construction rules. The SWA Plan (DEQ, 1999) identifies that having 100 feet of water column before screening provides a buffering capacity to infiltrating contaminants.

The Bone Store Well rated moderate (Table 2) for potential contaminant sources and land use for IOCs (e.g., nitrates), VOCs (e.g., petroleum products), SOC (e.g. pesticides), and microbial contamination (e.g., total coliform). The improved highway, the local creek, and the gas station added to the rankings all types of contamination. The land use survey identified that agricultural land plays a significant role within the area of the delineation. In addition, county level application of nitrogen fertilizer, herbicides, and total agricultural chemicals is rated high, adding to the total points.

The final susceptibility ranking for the well is high for IOCs, VOCs, and SOC, and moderate for microbial contaminants (see Table 2). Sources within 50 feet of the wellhead can give an automatic high score for the type of contaminant in question. A copy of the susceptibility analysis for the Bone Store well along with a map showing potential contaminant sources are included with this summary. Information regarding the potential contaminants within the 1,000-foot boundary have been summarized and included in Table 1.

Table 2. Summary of Bone Store Susceptibility Evaluation

| | Susceptibility Scores ¹ | | | | | | | | | |
|--------|------------------------------------|------------------------------------|-----|-----|-----------|---------------------|------------------------------|-----|-----|-----------|
| | Hydrologic Sensitivity | Contaminant Inventory ² | | | | System Construction | Final Susceptibility Ranking | | | |
| | | IOC | VOC | SOC | Microbial | | IOC | VOC | SOC | Microbial |
| Well 1 | H | M | M | M | M | M | H | H | H | M |

¹H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility

²IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical, M= microbial

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources. If the system should need to expand in the future, new well sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

Protection Activities

For the Bone Store water system, drinking water protection activities should focus on maintaining the requirements of the sanitary survey. A properly vented sanitary seal needs to be installed. No chemicals should be stored or applied within 50 feet of the well. Any releases on the highway or in the river within the delineation boundary should be evaluated and the drinking water should be evaluated following such a release. Working with the local soil and conservation district and Caribou County will better inform the water system operator of chemicals that may be applied or stored near the drinking water well. The water system operator is also encouraged to develop a drinking water protection plan to document and rank potential contaminant sources, assess protection efforts, and provide education for staff and the public about the drinking water.

Partnerships with state and local agencies and industry groups should be established and are critical to success. Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission, the local Soil Conservation District, and the Natural Resources Conservation Service.

Assistance

A water system must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (i.e. zoning, permitting) or non-regulatory in nature (i.e. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact Jack Rainey in the Idaho Department of Environmental Quality Idaho Falls Regional Office at (208) 528-2650.

Water suppliers serving fewer than 10,000 persons may contact Ms. Melinda Harper, Idaho Rural Water Association, at 208-343-7001 (mlharper@idahoruralwater.com) for assistance with drinking water protection (formerly wellhead protection) strategies.

POTENTIAL CONTAMINANT INVENTORY LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLIS – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as Superfund is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few heads to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of storm water runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (IDEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100-year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5mg/l.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25% of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RCRIS – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by IDEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory

References Cited

Idaho Department of Environmental Quality, 1999. Source Water Assessment Plan.

Idaho Department of Environmental Quality, 1997. Design Standards for Public Drinking Water Systems. IDAPA 58.01.08.550.01.

Idaho Department of Water Resources, 1993. Administrative Rules of the Idaho Water Resource Board: Well Construction Standards Rules. IDAPA 37.03.09.

Idaho District Seven Health Department, 2001. Sanitary Survey Report, Bone Store.

The final scores for the **Bone Store** susceptibility analysis were determined using the following formulas:

- 1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.27)
- 2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.375)

Final Susceptibility Scoring:

- 0 - 5 Low Susceptibility
- 6 - 12 Moderate Susceptibility
- > 13 High Susceptibility

| | | | | | |
|---|-------------------------|-----------|-----------|-----------|-----------------|
| 1. System Construction | | SCORE | | | |
| Drill Date | 11/17/2000 | | | | |
| Driller Log Available | YES | | | | |
| Sanitary Survey (if yes, indicate date of last survey) | YES | 2001 | | | |
| Well meets IDWR construction standards | NO | 1 | | | |
| Wellhead and surface seal maintained | YES | 0 | | | |
| Casing and annular seal extend to low permeability unit | NO | 2 | | | |
| Highest production 100 feet below static water level | NO | 1 | | | |
| Well located outside the 100 year flood plain and protected from surface flooding | YES | 0 | | | |
| Total System Construction Score | | 4 | | | |
| 2. Hydrologic Sensitivity | | | | | |
| Soils are poorly to moderately drained | NO | 2 | | | |
| Vadose zone composed of gravel, fractured rock or unknown | NO | 0 | | | |
| Depth to first water > 300 feet | NO | 1 | | | |
| Aquitard present with > 50 feet cumulative thickness | NO | 2 | | | |
| Total Hydrologic Score | | 5 | | | |
| 3. Potential Contaminant / Land Use - ZONE 1A | | IOC Score | VOC Score | SOC Score | Microbial Score |
| Land Use Zone 1A | UNDETERMINED AGRICULTUE | 2 | 2 | 2 | 2 |
| Farm chemical use high | YES | 2 | 0 | 2 | |
| IOC, VOC, SOC, or Microbial sources in Zone 1A | NO | NO | NO | NO | NO |
| Total Potential Contaminant Source/Land Use Score - Zone 1A | | 2 | 2 | 2 | 2 |
| Potential Contaminant / Land Use - ZONE 1B | | | | | |
| Contaminant sources present (Number of Sources) | YES | 2 | 3 | 3 | 2 |
| (Score = # Sources X 2) 8 Points Maximum | | 4 | 6 | 6 | 4 |
| Sources of Class II or III leacheable contaminants or 4 Points Maximum | YES | 4 | 3 | 2 | |
| Zone 1B contains or intercepts a Group 1 Area | NO | 0 | 0 | 0 | 0 |
| Land use Zone 1B Between 25% and 50% Irrigated Agricultural Land | | 2 | 2 | 2 | 2 |
| Total Potential Contaminant Source / Land Use Score - Zone 1B | | 10 | 11 | 10 | 6 |
| Cumulative Potential Contaminant / Land Use Score | | 14 | 13 | 14 | 8 |
| Weighted Potential Contaminant / Land Use Score | | 4 | 4 | 4 | 3 |
| 4. Final Susceptibility Source Score | | 13 | 13 | 13 | 12 |
| 5. Final Well Ranking | | High | High | High | Moderate |